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ALBERTA POWER COMMISSION

1968

ANNUAL REPORT

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GOVERNMENT OF THE PROVINCE OF ALBERTA

ANNUAL REPORT

OF THE

ALBERTA POWER COMMISSION

FOR THE YEAR ENDING

DECEMBER 31, 1968

EDMONTON

J. G. MacGREGOR

CHAIRMAN

February 12, 1969

The Honourable A. R. Patrick
Minister of Industry & Tourism
Legislative Building
EDMONTON, Alberta

Sir:

I have the honour to submit herewith the Annual Report of the Alberta Power Commission for the calendar year ended December 31, 1968.

An audited statement of receipts and disbursements of the Alberta Power Commission will be sent under separate cover.

Respectfully submitted,

ALBERTA POWER COMMISSION

J. G. MacGregor, Chairman

ALBERTA POWER COMMISSION

1968

* * *

J. G. MacGregor	Chairman
W. C. Whittaker	Member
R. W. Losie	Member
J. L. Reid	Member & Secretary

* * *

THE CITY OF EDMONTON'S NEW GENERATING STATION AT CLOVER BAR, JUST EAST OF EDMONTON.

PREFACE

The Alberta Power Commission's duties, as set out under the Power Commission Act, are of a regulatory and supervisory nature. The Commission does not own or operate any power plants, transmission lines or distribution systems. In this respect it is different from the Power Commissions in all the other provinces except Prince Edward Island and Newfoundland. Many of its duties are covered by Section 6 of the Power Commission Act, which is as follows:

"Whenever required so to do by the Lieutenant Governor in Council, the Commission shall inquire into, examine and investigate -

(a) water powers and water privileges in Alberta, their value and capacity;

(b) the existing facilities for the manufacture and distribution of power in Alberta;

(c) such other matters relating to power and its distribution in Alberta as the Lieutenant Governor in Council from time to time may require; and shall report thereon to the Lieutenant Governor in Council."

The Commission feels that, at the present time, its principal duties are threefold:

1. The collection of statistics of the Electric Utility Industry in the Province, and the study of these statistics, so that the people of the Province will have a true picture of the industry.
2. The study of hydro-electric sites and other power possibilities

in the Province. The Commission also has been engaged in a study of the existing network of transmission lines in the Province with particular reference to more extensive interconnection which will ensure the most efficient use of the large generating units which are already in operation and of those anticipated in the future.

3. Farm Electrification - This is a phase of its work to which the Commission devotes much of its time. While the main network of farm electrification lines is completed, problems of operating the farm lines, some of which are now over fifteen years old, are taking much more time. The Commission is constantly engaged in studying new operating problems as they come up.

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Main Transmission Lines in Province, December, 1968.......... Back Cover.

ALBERTA POWER COMMISSION

ANNUAL REPORT

For Year Ending December 31, 1968

Economic conditions in Alberta have continued the remarkably encouraging trend of the last few years. The four bases upon which the province's progress stands; agriculture, mineral production, construction, and manufacturing have all presented pleasing prospects. While the uncertainties of rapid inflation are taking their toll, and adding seriously to the cost of providing the large power facilities, which are continuously under construction, these works are being provided to serve the growing population which is now estimated at 1,526,000.

In addition to a high rate of increase in all these, the discovery of more and more petroleum products north of the 55th Parallel of Latitude has been very encouraging. Accompanying these activities has been a related increase of 13 per cent in the power generated in the province.

The K.W.H. generated per capita--another good indicator of economic conditions--has increased from 4,185 to 4,631. Ten years ago, in 1958, this per capita figure was 2,060, so on the average every person in Alberta has over twice as much electricity available to serve him as he did ten years ago. The province is switching over to an industrial economy.

Producing and distributing this greatly increased output of electricity has meant not only the continued expansion of power plants but has also meant a marked expansion in one phase of the electrical industry which receives but scant recognition; that is, the great increase in the mileage of the network of high voltage transmission and interconnecting lines.

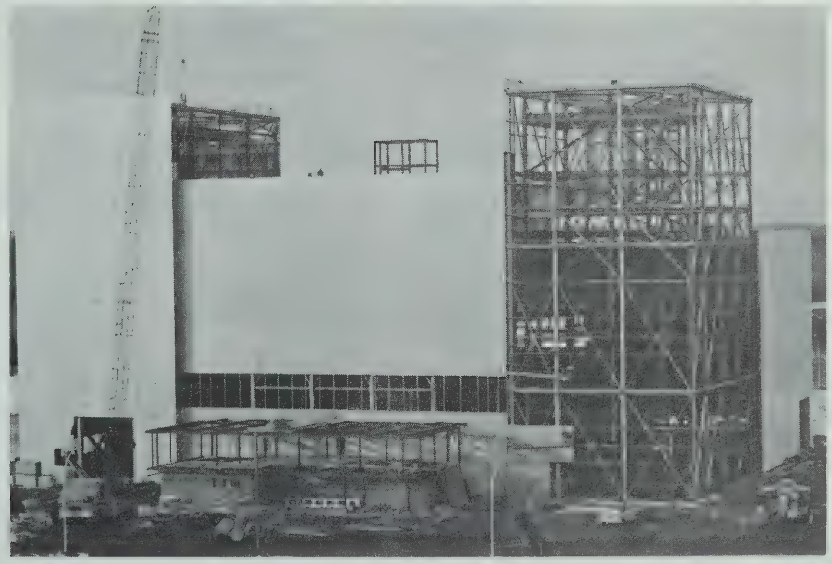
The increase in the use of electricity in Alberta during the past year is indicated by the following short summary. The figures compiled in it and throughout this report are confined to the Electric Utility Industry and are comparable to those presented by the Dominion Bureau of Statistics under the category of "Utilities".

It should be noted that in Tables 10-14 incl., 16, 20 and 21 "Capability" has been substituted in place of Capacity used in former reports.

K.W.H. Generated and Peak Load - The increase in K.W.H. generated over that of the previous year was 13.3 per cent. Thermal plants generated 85 per cent of the K.W.H. produced, while of the total output, internal combustion plants accounted for 4.2 per cent. This power, of course, is mainly that generated by Northland Utilities Ltd. and Canadian Utilities Ltd. in the Peace River country and includes the power generated by gas turbines at Valleyview, Simonette and Rainbow. The actual peak load on the interconnected system which extends as far north as Rainbow Lake was 1,457 M.W.--an increase of 12 per cent.

Transmission lines in the province increased by 1,410 circuit miles to a total of 17,217, which excludes 3,050 miles of company-owned farm lines. Distribution line mileage increased to 7,177. The total circuit mileage of all farm lines built during the year was 497 miles, but because of some changes in reporting, the statistics for the year end show a total of 47,755 miles of farm line. The total circuit mileage of all power lines in the province at the end of December, 1968 was 72,149.

The figures in Tables 1 to 5 inclusive, and in Tables 8 and 9, which follow, are comparisons with the other Prairie Provinces and with Canada as a whole. Except for those marked with an asterisk (*), the figures used are those obtained from the Dominion Bureau of Statistics. Table No. 8 has been changed to bring it into line with the number of farmers actually billed as at the end of each year and no longer shows the total number of farm services built in the province.



THE CITY OF EDMONTON'S CLOVER BAR GENERATING STATION UNDER CONSTRUCTION

Table No. 1 shows the capacity in M.W. net of the Utility Electric Stations in Canada for the past several years.

TABLE NO. 1

Capacity of Utility Electric Stations

M.W. Net

Year	Alberta*	Canada	Saskatchewan	Manitoba
1957	596	13,444	452	644
1958	718	14,759	529	741
1959	750	16,937	670	757
1960	917	18,419	737	1,024
1961	947	19,492	754	1,063
1962	1,092	20,383	751	1,065
1963	1,137	21,200	836	1,068
1964	1,178	21,891	922	1,060
1965	1,326	24,157	922	1,387
1966	1,609	25,755	962	1,391
1967	1,895	27,521	1,033	1,407
1968	1,895 (1)			

Increase during the 10-year period ended 1967

	Alberta	Canada	Saskatchewan	Manitoba
1957-1967 Increase:	1,299	14,077	581	763
Per cent Increase:	218%	105%	129%	118%

* Figures for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

(1) 1968 figure for Alberta is "Net Capability", all other figures are "Capacity".

Table No. 2 shows the growth of K.W.H. Generated net during the past several years.

TABLE NO. 2

Electric Energy Generated Net by Utilities

(Millions of K.W.H.)

Year	Alberta	Canada	Saskatchewan	Manitoba
1957	2,249	71,523	1,678	3,341
1958	2,474	75,953	1,810	3,214
1959	2,830	83,049	1,998	3,598
1960	3,126	89,077	2,103	3,690
1961	3,451	89,389	2,422	3,786
1962	3,767	92,096	2,594	4,305
1963	4,141	93,501	2,875	4,785
1964	4,645	102,880	3,202	4,915
1965	5,187	110,798	3,548	5,417
1966	5,739	125,998	3,752	6,102
1967	6,284	133,301	4,151	6,499
1968	*7,066			

Increase during the 10-year period ended 1967

Year	Alberta	Canada	Saskatchewan	Manitoba
1957-1967 Increase:	4,035	61,778	2,473	3,158
Per cent Increase:	179%	86%	147%	95%

Increase Alberta: 1958 - 1968 = 186%

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* 1968 figures for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

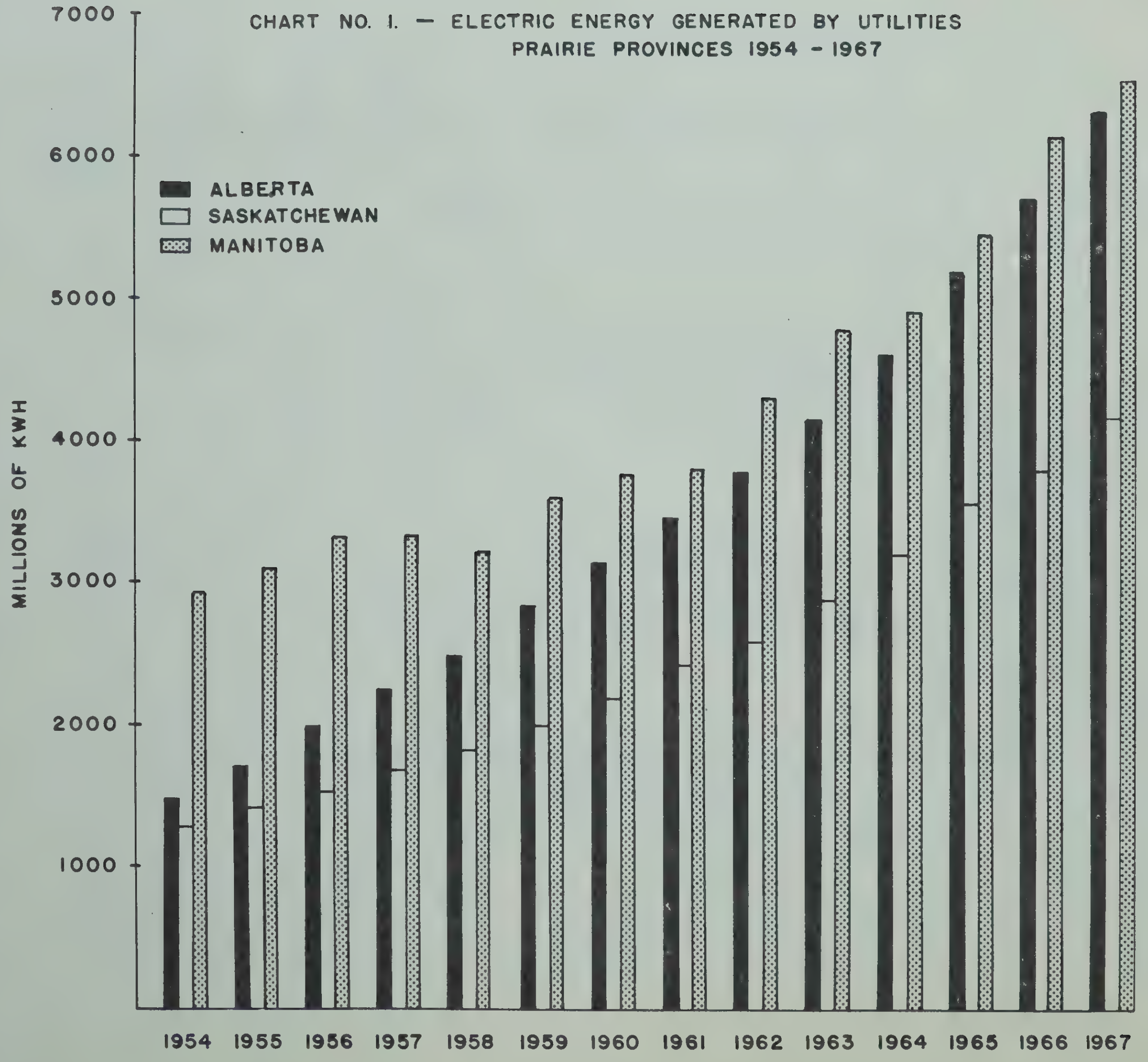


CHART NO. I. — ELECTRIC ENERGY GENERATED BY UTILITIES
PRAIRIE PROVINCES 1954 - 1967

TABLE NO. 3

Annual K.W.H. used per Domestic and Farm Customer

Year	Alberta	Canada	Saskatchewan	Manitoba
1957	2,373	3,960	2,577	5,895
1958	2,532	4,128	2,696	6,113
1959	2,859	4,338	2,974	5,993
1960	2,989	4,490	3,019	6,184
1961	3,224	4,660	3,112	6,535
1962	3,417	4,870	3,440	6,468
1963	3,595	5,084	3,688	6,630
1964	3,813	5,307	3,918	7,237
1965	4,193	5,630	4,397	7,582
1966	4,430	5,911	4,673	7,637
1967	4,591	6,261	4,943	7,837

These are all D.B.S. figures.

TABLE NO. 4

Costs in Cents per K.W.H. Domestic and Farm Customers

Year	Alberta	Canada	Saskatchewan	Manitoba
1957	2.44	1.62	3.11	1.13
1958	2.40	1.61	3.08	1.06
1959	2.28	1.61	3.01	1.15
1960	2.22	1.60	2.98	1.16
1961	2.17	1.58	2.93	1.15
1962	2.15	1.54	2.83	1.14
1963	2.05	1.52	2.76	1.16
1964	1.99	1.47	2.59	1.17
1965	1.92	1.43	2.35	1.15
1966	1.87	1.41	2.27	1.18
1967	1.84	1.45	2.22	1.17

These are all D.B.S. figures.

TABLE NO. 5

Total Number of Customers of Utilities

(thousands)

Year	Alberta	Canada	Saskatchewan	Manitoba
1957	295	4,597	220	258
1958	316	4,798	230	267
1959	339	5,009	241	282
1960	355	5,178	256	287
1961	368	5,366	265	300
1962	384	5,531	271	304
1963	396	5,647	276	297
1964	408	5,844	286	313
1965	420	5,981	292	303
1966	428	6,147	300	310
1967	439	6,321	307	313
1968	* 459			

Increase during the 10-year period ending 1967

	Alberta	Canada	Saskatchewan	Manitoba
1957-1967 Increase:	144	1,724	87	55
Per cent Increase:	49%	38%	40%	21%

Increase Alberta: 1958 to 1968 = 45%

* 1968 figures for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

TABLE NO. 6

TOTAL CIRCUIT LINE MILEAGE IN ALBERTA

(Includes transmission, distribution and farm lines)

Year	Trans-mission	Distri-bution	R.E.A. Lines	Company-owned Farm Line	Total Lines
1958	9,105	4,264	32,437	2,915	48,721
1959	9,693	4,679	35,047	2,949	52,368
1960	10,096	5,034	36,661	3,030	54,821
1961	10,677	5,309	38,058	3,069	57,113
1962	11,491	5,807	39,393	3,086	59,777
1963	12,193	5,819	40,570	3,118	61,700
1964	13,152	6,079	41,652	3,100	63,983
1965	13,839	6,346	42,710	3,137	66,032
1966	14,549	6,628	43,706	3,140	68,023
1967	15,807	6,852	44,279	3,263	70,201
1968	17,217	7,177	44,705	3,050 *	72,149
1958-1968 Increase:	8,112	2,913	12,268	135	23,428
Per cent Increase:	89%	68%	38%	5%	48%

* Some farm line mileages have been reported on a different basis to that used in previous years.

All figures compiled by the Alberta Power Commission.

TABLE NO. 7

K.W.H. GENERATED PER CAPITA IN ALBERTA

Year	Population	KWH Generated x 10^6	KWH Generated/ Capita
1958	1,201,000	2,474	2,060
1959	1,243,000	2,830	2,277
1960	1,283,000	3,126	2,436
1961	1,332,000	3,446	2,587
1962	1,370,000	3,768	2,750
1963	1,405,000	4,186	2,979
1964	1,432,000	4,596	3,209
1965	1,451,000	5,138	3,541
1966	1,463,000	5,689	3,889
1967	1,490,000	6,235	4,185
1968	1,526,000	7,066	4,631

TABLE NO. 8

Number of Farms Served by Utilities

as at December 31 each year

Year	Alberta	Saskatchewan	Manitoba
1957	37,595	44,955	38,120
1958	40,847	50,813	38,700
1959	46,258	55,424	39,027
1960	49,757	59,384	39,162
1961	52,316	62,260	39,326
1962	54,689	59,684	39,489
1963	57,034	61,084	39,639
1964	58,604	62,436	39,589
1965	60,064	62,260	39,452
1966	59,431	65,531	39,594
1967	60,863	67,147	39,579
1968	* 63,235		

* 1968 figure for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

The Alberta figure is for farms actually billed instead of farms with service available, as shown in previous years.

TABLE NO. 9

Consumption in K.W.H. per Farm Per Year

Year	Alberta	Canada	Saskatchewan	Manitoba
1957	3,297	3,415	2,490	4,238
1958	3,566	3,686	2,670	4,586
1959	3,956	4,086	3,180	5,366
1960	4,029	4,345	3,315	5,523
1961	4,404	4,654	3,537	5,995
1962	4,804	5,204	4,198	6,637
1963	4,905	5,985	4,581	7,234
1964	5,370	6,361	5,059	7,921
1965	6,051	7,045	6,065	9,098
1966	6,594	7,720	6,268	9,578
1967	7,128	8,548	6,813	10,504
1968	*7,343			

* 1968 figure for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

PRESENT STATUS OF THE INDUSTRY

The statistics for the Electric Utilities for the year 1968 follow. Some of the minor figures are estimates only, due to the fact that the report has to be prepared before the various utilities have completed their statistics for the past year. These minor estimates will not be in error by more than 1% or 2%, so that the error on the whole will be negligible.

Tables 10 to 16 deal with plant capability, peak load and K.W.H. generated. They break up the figures to show what was generated by hydro, steam and internal combustion engines, and also to show the proportions generated by the publicly-owned and privately-owned plants. Even though the Peace River country is now tied into the provincial grid by two 138 K.V. transmission lines, it is desirable to keep a separate set of figures for its generation, consumption, etc. As a result, these figures are collected in Tables 16 to 20 as a Peace River subtotal.

In 1968, the interconnected system shown in Group A in the tables had a combined capability of 1,877,000 K.W., and generated 7,031,828,000 K.W.H. It served 456,338 customers. This system accounts for over 99 per cent of the generating capacity of the province, and of the K.W.H. generated and number of customers served.

The Peace River Country interconnected system shown as a subtotal under Group A had a combined capability of 74,300 K.W., generated 262,366,000 K.W.H. and served 22,993 customers.

The hydro plants of Calgary Power Ltd. are rated as follows:-

TABLE NO. 10

1968 rating of Calgary Power Ltd. hydro plants:

Plant	Gross H.P.	Net Capability K.W.
Pocaterra	18,500	14,900
Interlakes	6,900	5,000
Rundle	63,000	49,900
Spray	124,000	102,800
Three Sisters	3,600	3,000
Cascade	46,000	35,900
Horseshoe	20,000	13,900
Kananaskis	24,000	18,900
Barrier	16,000	12,900
Ghost	67,450	50,900
Bearspaw	22,000	16,900
Brazeau	450,000	355,000
	861,450	680,000

NORTHLAND UTILITIES LTD. NEW GENERATING STATION AT RAINBOW LAKE.

TABLE NO. 11

1968 rating of major thermal plants.

Plant	Fuel	Net Capability K.W.
Calgary Power Ltd.		
Wabamun	Gas	68,000
Wabamun	Coal	501,000
Canadian Utilities Ltd. and Northland Utilities Ltd.		
Battle River	Coal	66,000
Drumheller	Coal	15,500
Vermilion	Gas	9,000
* Sturgeon	Gas	18,500
* Simonette	Gas	19,000
* Rainbow	Gas	28,000
Fort McMurray	Oil & Gas	7,550
Fairview	Gas	8,800
* City of Edmonton	Gas	392,000
* City of Lethbridge	Gas	30,700
City of Medicine Hat	Gas	40,500

* Includes Gas Turbines

Chart No. 2 on Page 14 shows the power generated in the province year by year broken down by the sources of energy used. In so doing, it points up the rapid increase in importance of thermal generation and particularly of coal-fired steam plants.

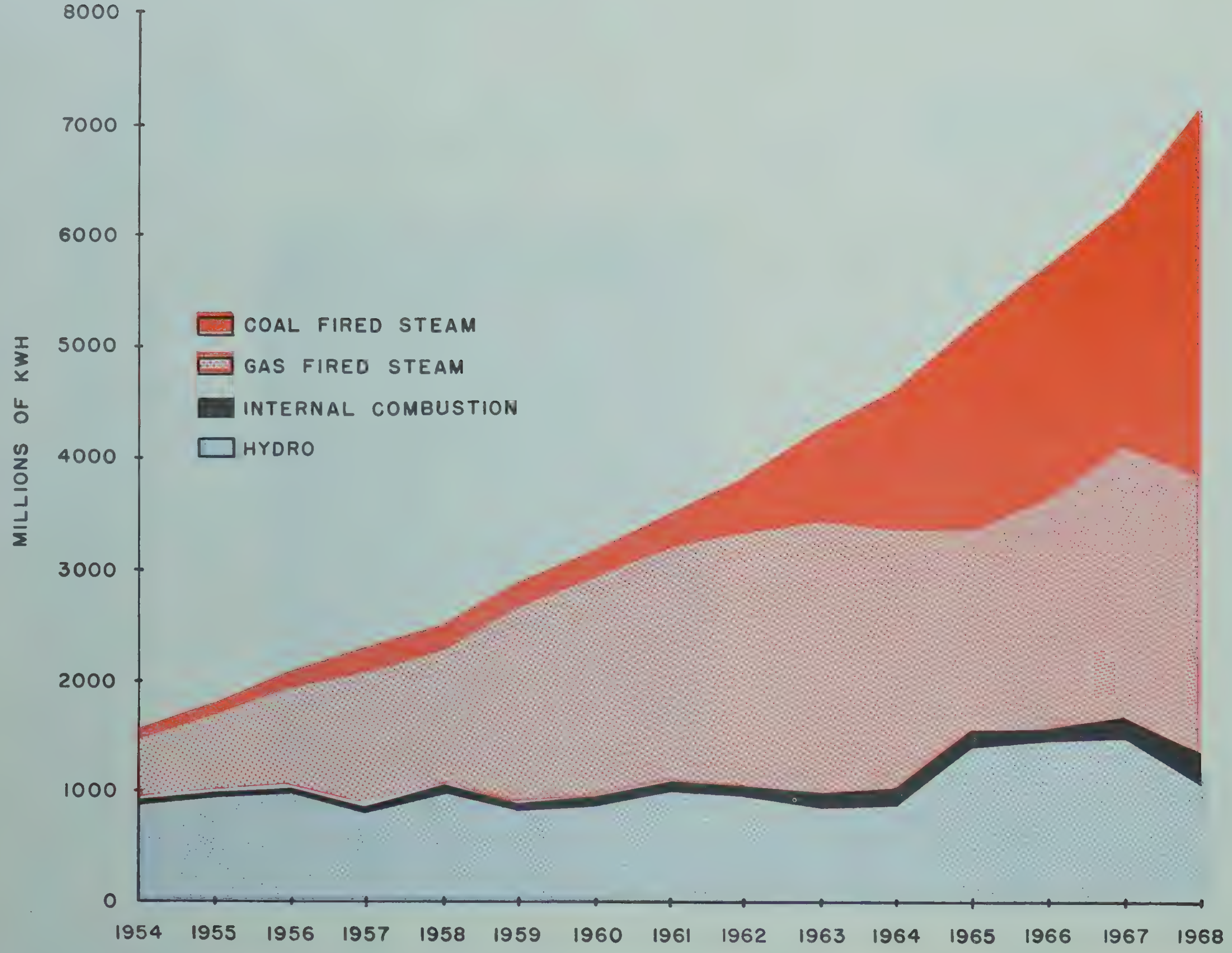


CHART NO. 2 - ELECTRIC ENERGY GENERATED IN ALBERTA 1954 - 1968 BY SOURCES OF ENERGY.

TABLE NO. 12

The following Companies or Municipalities provide Central Station Electrical Service in the province. This table gives preliminary data as to their plant capabilities at the end of 1968. It also gives the peak loads on their plants and the M.W.H. they generated (net) during 1968.

PRIVATELY OWNED

Name of Company	Net Capability K.W.	Net Peak Load K.W.	Net Generation M.W.H.
Calgary Power Ltd.	1,249,000	956,500	4,393,462
Canadian Utilities Ltd. & Northland Utilities Ltd.	182,465	124,926	767,280
	1,431,465		5,160,742

PUBLICLY OWNED

Name of Municipality	Net Capability K.W.	Net Peak Load K.W.	Net Generation M.W.H.
City of Edmonton	392,000	352,000	1,547,374 (1)
City of Lethbridge	30,700	31,000	150,607 (2)
City of Medicine Hat	40,500	40,000	207,728 (3)
	463,200		1,905,709
Total	1,894,665		7,066,451

(1) Includes 125,728,500 K.W.H. supplied to system.

(2) Includes 9,274,200 K.W.H. supplied to system.

(3) Includes 57,830,700 K.W.H. supplied to system.

TABLE NO. 13

The following is a rearrangement of the figures in Table 12, so as to break them down into power generated by hydro, steam and internal combustion plants during 1968. Some of the thermal plants include gas turbines.

Name of Company	Net Capability K.W.	Net Peak Load K.W.	Net Generation M.W.H.
HYDRO			
Calgary Power Ltd.	680,000	588,200	1,059,331
Northland Utilities Ltd.	1,400	900	3,879
Total Hydro:	681,400		1,063,210
STEAM			
Calgary Power Ltd.	569,000	579,500	3,334,050
Canadian Utilities Ltd.	90,500	65,000	470,291
City of Edmonton	392,000*	352,000	1,547,374 (1)
City of Lethbridge	30,700*	31,000	150,607 (2)
City of Medicine Hat	40,500	40,000	207,728 (3)
Total Steam:	1,122,700		5,710,050
INTERNAL COMBUSTION			
Calgary Power Ltd.	-	-	81
Canadian Utilities Ltd. and Northland Utilities Ltd.	90,565*	59,026	293,110
Total Internal Combustion:	90,565		293,191
GRAND TOTAL:	1,894,665		7,066,451

* Includes gas turbines.

(1) Includes 125,728,500 K.W.H. supplied to system.

(2) Includes 9,274,200 K.W.H. supplied to system.

(3) Includes 57,830,700 K.W.H. supplied to system.

TABLE NO. 14

The following table may be of interest as showing the relative percentages of of capacity and generation in 1968, as set out in the foregoing tables.

Method of Generation	% of Capability	% of Power Generated
Hydro	36.0	15.0
Steam & Gas Turbine	59.2	80.8
Internal Combustion	4.8	4.2
	100.0	100.0

- - - - - - - - - - - - - - - - - -

Publicly owned	24.4	27.0
Privately owned	75.6	73.0
	100.0	100.0

TABLE NO. 15

The following is a breakdown of the fuel used in larger thermal plants during 1968.

	Gas M.C.F.	Oil Gallons	Coal Tons
Calgary Power Ltd.			
Wabamun	5,575,952	-	1,924,750
Sentinel	-	-	6,101
Smoky River	-	6,237	-
Canadian Utilities Ltd. and Northland Utilities Ltd.			
Drumheller	-	-	81,880
Battle River	-	-	332,721
Vermilion	108,398	-	-
Valleyview	2,129,530	-	-
Simonette	1,436,767	-	-
Rainbow	-	3,471,639	-
Fairview	156,842	-	-
Miscellaneous	169,658	1,440,764	-
City of Edmonton	17,590,036	3,193,471	-
City of Lethbridge	2,959,125	-	-
City of Medicine Hat	3,567,246	-	-
	33,693,554	8,112,111	2,345,452

TABLE NO. 16

SUMMARY OF GENERATING PLANTS IN ALBERTA

As at December 31, 1968

	Hydro		Steam		Internal Combustion	
	Net Capability K.W.	Net Generation 1968 M.W.H.	Net Capability K.W.	Net Generation 1968 M.W.H.	Net Capability K.W.	Net Generation 1968 M.W.H.
A. WITHIN THE INTERCONNECTED SYSTEM						
Calgary Power Ltd.	680,000	1,059,331	569.000	3,334,050	-	81
Canadian Utilities Ltd.			90,500	470,291		
City of Edmonton *			392,000	1,547,374		
City of Lethbridge *			30,700	150,607		
City of Medicine Hat			40,500	207,728		
Sub-total	680,000	1,059,331	1,122,700	5,710,050	-	81
Peace River Interconnected System						
Canadian Utilities Ltd. and Northland Utilities Ltd. *					74,300	262,366
Peace River Sub-total					74,300	262,366
TOTAL GROUP A INTERCONNECTED SYSTEM	680,000	1,059,331	1,122,700	5,710,050	74,300	262,447
B. ISOLATED SYSTEMS						
Canadian Utilities Ltd.						
McMurray					7,550	15,172
Miscellaneous Small Plants					1,560	1,311
Northland Utilities Ltd.						
Jasper	1,400	3,879			3,825	8,433
Miscellaneous Small Plants					3,330	5,828
TOTAL GROUP B ISOLATED SYSTEMS	1,400	3,879			16,265	30,744
COMBINED TOTALS	681,400	1,063,210	1,122,700	5,710,050	90,565	293,191
GRAND TOTALS FOR PROVINCE			1,894,665	7,066,451		

* Includes gas turbines.

TABLE NO. 17

Total Circuit Miles of transmission lines in the Province by regional groups as at December 31, 1968. This does not include company-owned or co-operative-owned farm lines.

	VOLTAGE			
	Up to 22,000	33,000 to 72,000	132,000 & greater	Total
A. Within the Interconnected System				
Calgary Power Ltd.	7,751	1,487	2,442	11,680
Canadian Utilities Ltd.	1,499	888	309	2,696
City of Medicine Hat	42	-	-	42
Sub-total:	9,292	2,375	2,751	14,418
Systems within the Peace River Country				
Canadian Utilities Ltd.	443	431	258	1,132
Northland Utilities Ltd.	841	240	496	1,577
Peace River Sub-total:	1,284	671	754	2,709
Total Group A - Interconnected System	10,576	3,046	3,505	17,127
B. Isolated Towns				
Canadian Utilities Ltd.				
McMurray	42	-	-	42
Northland Utilities Ltd.				
Jasper	48	-	-	48
Total Group B - Isolated Systems	90			90
COMBINED TOTALS:	10,666	3,046	3,505	17,217

TABLE NO. 18

SUMMARY OF DISTRIBUTION SYSTEMS IN ALBERTA

As at December 31, 1968

	Total Number of Customers Served (includes farms)	M.W.H. Sold, less Sales to other Companies (includes farms)	Circuit Miles of line (excludes farms)
A. WITHIN THE INTERCONNECTED SYSTEM			
(1) Southern Area			
Calgary Power Ltd.	140,000 (est.)	2,349,000 (est.)	2,316
Canadian Utilities Ltd.	39,351	359,151	813
City of Edmonton	108,976	1,294,000	1,058
City of Calgary	110,679	1,342,172	1,248
City of Lethbridge	12,100	132,249	150
City of Medicine Hat	9,594	149,899	131
City of Red Deer	7,713	82,520	155
Town of Ponoka	1,641	11,383	27
Town of Cardston	1,065 (est.)	4,965 (est.)	35 (est.)
Town of Ft. Macleod	990 (est.)	5,500 (est.)	22 (est.)
Town of Blairmore	530	1,967	6
Town of Coleman	523	2,290	5
Village of Cowley	65	324	2
Village of Frank	60 (est.)	260	2
Village of Lundbreck	58	229	2
Southern Area Sub-total	433,345	5,735,909	5,972
(2) Peace River Area			
Canadian Utilities Ltd.	11,741	184,811	706
Northland Utilities Ltd.	11,252	126,749	434
Peace River Area Sub-total	22,993	311,560	1,140
TOTAL GROUP A INTERCONNECTED SYSTEM	456,338	6,047,469	7,112
B. ISOLATED SYSTEMS			
Canadian Utilities Ltd.			
McMurray	1,747	13,499	22
Miscellaneous Small Plants	157	1,210	6
Northland Utilities Ltd.			
Jasper	939	11,111	32
Miscellaneous Small Plants	201	897	5
TOTAL GROUP B ISOLATED SYSTEMS	3,044	26,717	65
COMBINED TOTALS	459,382	6,074,186	7,177

TABLE NO. 19

SUMMARY OF RURAL ELECTRIFICATION SYSTEMS IN ALBERTA AS AT DECEMBER 31, 1968

	Farm Services With Power In Use	Non-Farms Served By Farm Lines	Total Services In Use On Farm Lines	Circuit Miles of Farm Line
INTERCONNECTED SYSTEM - SOUTHERN AREA				
Calgary Power Ltd.				
Experimental Areas and Individual Rurals	4,136	1,235	5,371	2,434 *
R.E.A.'s	40,049	8,186	48,235	28,500
Canadian Utilities Ltd.				
Experimental Areas and Individual Rurals	684	123	807	385 *
R.E.A.'s	11,949	1,097	13,046	10,954
Livingstone R.E.A. and Lundbreck Co-op	140	58	198	144
Adjacent to Cities, etc.	120	-	120	55 *
Southern Area Sub-total	57,078	10,699	67,777	42,472
INTERCONNECTED SYSTEM - PEACE RIVER AREA				
Canadian Utilities Ltd.				
Experimental Areas and Individual Rurals	127	123	250	73 *
R.E.A.'s	2,973	205	3,178	2,569
Northland Utilities Ltd.				
Experimental Areas and Individual Rurals	156	-	156	103 *
R.E.A.'s	2,901	257	3,158	2,538
Peace River Area Sub-total	6,157	585	6,742	5,283
TOTAL - INTERCONNECTED SYSTEM	63,235	11,284	74,519	47,755 (1)

* The lines to serve these farms are the property of the Power Companies.

(1) Some farm line mileages have been reported on a different basis to that used in previous years.

TABLE NO. 20

DATA BY REGIONAL GROUPS
As at December 31, 1968

	GROUP A INTERCONNECTED SYSTEM			GROUP B ISOLATED SYSTEM	COMBINED TOTALS
	South Area	Peace River Area	Sub-total		
PLANTS					
K.W. Capability	1,802,700	74,300	1,877,000	17,665	1,894,665
M.W.H. Generated	6,769,462	262,366	7,031,828	34,623	7,066,451
TRANSMISSION					
Miles of Line	14,418	2,709	17,127	90	17,217
DISTRIBUTION					
Number of Customers	433,345	22,993	456,338	3,044	459,382
M.W.H. Sold	5,735,909	311,560	6,047,469	26,717	6,074,186
Miles of Line	5,972	1,140	7,112	65	7,177
RURAL					
Number of farms (1)	57,078	6,157	63,235	-	63,235
Number of non-farms (1)	10,699	585	11,284	-	11,284
Miles of Company owned farm line (2)	2,874	176	3,050	-	3,050
Miles of R.E.A. Line (2)	39,598	5,107	44,705	-	44,705
Total farm lines	42,472	5,283	47,755	-	47,755

(1) Included in Number of customers shown under Distribution.
(2) Not included in Miles of Line shown under Distribution or Transmission Lines.

GENERAL OUTLOOK

No significant generating equipment was commissioned during 1968 but the various corporations continued with their preparations to bring more units on the line according to schedules laid out some years ago. The City of Edmonton continued with the construction of its new Clover Bar station leading up to the installation of its first unit rated at 165 M.W. in 1970. Canadian Utilities Ltd. made good progress towards installing a 150 M.W. unit which is expected to come on the line in its Battle River plant during 1969. Calgary Power Ltd. continued work on its Sundance station, where it is planned to have the first 300 M.W. unit in service during 1971.

As well as these major projects within the interconnected system, Canadian Utilities Ltd. increased its generating capacity in the isolated Town of Ft. McMurray. Northland Utilities Ltd. closed its diesel plant in High Level when that point was served by a 138 K.V. transmission line. During the summer, Northland Utilities Ltd. built a temporary 1,850 K.W. plant at Zama. As well as this, the 28,000 K.W. gas turbine which had been in Canadian Utilities Ltd. Vermilion plant was moved to Rainbow Lake where it is operated by Northland Utilities Ltd. That Company's load in the general Rainbow Lake area is expanding rapidly and significant changes are taking place all the time. Transmission facilities are under construction to connect the Zama system to the interconnected system at Rainbow Lake.

During 1968, Northland Utilities Ltd. increased its mileage of 138 KV transmission line in the Peace River area by some 209 miles. Its activities in the North have extended the provincial grid to a point some 650 miles north of the U.S. border. At the end of the year,

A HELICOPTER HELPS TO BUILD THE MAIN TRANSMISSION LINE FROM THE WABAMUN GENERATING STATION TO LESSER SLAVE LAKE.

the three companies were operating some additional 45 miles of 69 K.V., some 532 miles of additional 138 K.V. and 236 additional miles of 240 K.V. line. One of the more important links is the 125 mile long 240 K.V. line which was built from the Wabamun plant to Lesser Slave Lake but is being operated at 138 K.V.

Year by year such transmission and interconnecting lines are constructed, but, while they are equally as important as power plants, they do not catch the public's attention. During the past ten years many miles of such grid facilities have been built.

With the activity in the Rainbow Lake area and its associated pipelines on the one hand, and the increasing activity in the Athabasca tar sands near Ft. McMurray on the other, the northern part of the province is assuming added industrial importance. The combination of 2,000,000 H.P. of hydro capacity on the Athabasca river and the energy of the tar sands makes the Ft. McMurray area worth watching.

Because of Alberta's rich endowment of energy resources with low costs per B.T.U., it becomes most difficult to predict which of them will be used for further power generation. Our program of installing future generating equipment, however, envisages coal-fired and gas-fired steam units with an occasional hydro plant such as the Bighorn which will be rated at about 100 M.W.

While installations of nuclear power have been making great strides in the East and in the U.S., they are still a long way from being competitive with Alberta's fossil fuels. Ultimately, perhaps before twenty years have elapsed, nuclear power will set the upper limit of what can be paid per million B.T.U.'s for coal for power generation.

To supply Alberta's load during the 30-year period from 1970 to 1999, we expect to add thermal plants totalling some 9,800 M.W. In addition to this, of course, there will be many M.W. installed in the existing or new hydro plants but, while it is possible that some hydro plants may be built for base load operation, this added capacity will be used mainly for peaking purposes. Naturally, the picture even twenty years from now is pretty hazy.

Normally we would expect to build a power plant on one of the seams of coal and then to install generators up to the limit of the capacity of that coal mine before moving on to another site on another mine. Other factors such as geography, etc. come into this picture and it is quite possible that a second power plant on a second mine would be started before all of the generating capacity is put into a previous plant. Normally, one would expect to develop the mine with the least costly coal first and then to move on to the next lowest cost coal. This, too, will not always be the case because of geographical considerations.

Somewhere after 1990, when loads are large enough to enable a large nuclear plant to operate at a high load factor, such a plant may then be competitive with the higher cost strip coals which are still not committed for base load generation. But even after having installed the first nuclear plant, it will probably be advisable to build more coal-fired plants before building a second nuclear station.

The following is a more detailed summary of the changes to generating capacity, transmission line facilities, etc., during the year 1968:

CALGARY POWER LTD.

(1) Plant Capacity

Construction is continuing on the installation of the first unit at the Sundance plant on the south side of Lake Wabamun. This will be a 286,000 KW (net) coal-burning unit and is scheduled for operation in 1971.

(2) Transmission Lines

During 1968, the main transmission lines have been increased (or decreased due to voltage conversion) as follows:-

240 KV

A single circuit steel tower line was completed from the Wabamun Thermal Plant to Benalto, a distance of 94.5 miles.

The voltage was raised from 138 KV to 240 KV on the existing steel tower line from Wabamun to North Calder, a distance of 38.5 miles.

138 KV

To date a total of 14.0 miles have been constructed from Fort Saskatchewan to Redwater to supply the Imperial Oil fertilizer plant.

Sixty-three miles of guyed aluminum tower line, constructed for 240 KV but energized at 138 KV, was constructed from the Wabamun Thermal Plant to interconnect with the Canadian Utilities Ltd. system north of Barrhead.

One mile of 138 KV was constructed at East Edmonton to supply the alternate supply to the Interprovincial Pipe Line Edmonton terminal.

Eleven miles of the Vulcan-Brooks line was rerouted on steel towers into Janet substation.

A steel tower line, constructed for 240 KV but operating at 138 KV, was constructed from Red Deer to Nevis to interconnect with Canadian Utilities Ltd. steel tower line from the Forestburg Thermal Plant.

Sixty-three miles of steel towers were constructed from Janet to Stavely and will operate initially at 138 KV.

69 KV

One and one-half miles of 69 KV was constructed at Redwater to supply the Fort Saskatchewan-Redwater line from the new Redwater substation.

Twelve miles of 69 KV was built east of Barrhead to supply the Federated Pipeline pumping station at High Ridge.

The line between Hardisty and Hughenden was salvaged in its entirety.

22 KV

Four miles were constructed to supply a new coal mine at Luscar.

CONSTRUCTION OF SPILLWAY AND CONTROL STRUCTURE AT THE BIG BEND DEVELOPMENT ON THE BRAZEAU RIVER.

(3) New Substations

Dow Chemical - 166S	80 MVA 132/14.4 KV substation for Dow Chemical Fort Saskatchewan with switching for three 138 KV lines.
Janet - 74 S	This is a 300 MVA 240/138 KV substation (two miles east of the city limits of Calgary), with switching for 1 - 240 KV and 4 - 138 KV lines. (The 300 MVA transformer replaces the 240 MVA transformer diverted to Edmonton in 1967.)
Jarrow - 252S	18.75 MVA 138/69 KV substation and 138 KV feed to Hardisty with switching for 1 - 138 KV line, 1 - 69 KV line and 15 MVA 69 KV regulator. This substation is tapped off Canadian Utilities No. 1 Line.
Red Deer South - 63S	160 MVA 240/138 KV substation for switching 138 KV line to Battle River and 138 KV feed into 80 line, (240/138 KV transformer to be installed in February, 1969).
Redwater - 168S	138 KV substation consisting of 1 - 18.75 MVA 132/13.2 KV transformer, 1 - 18.75 MVA 138/72 KV transformer feeding line to Boyle, switching for 2 - 138 KV lines and 1 - 69 KV line.
Natal - 170S	50 MVA 138/69 KV substation with switching for 2 - 138 KV and 4 - 69 KV lines. The 69 KV portion of the substation is owned and operated by B.C. Hydro.

Extensions to Main Substations

Benalto - 17S	Installed 240 KV air blast breaker for new line to Wabamun. Also 6 MVA 69/23 KV transformer and 1 - 69 KV oil circuit breaker.
East Edmonton - 38S	Installed 240 MVA 240/138 KV transformer.
Fort Saskatchewan - 54 S	Extended 138 KV bus. Installed 2 - 138 KV oil circuit breakers, 15 MVA 138/23.9 KV transformer, 15 MVA 23.9 KV regulator and 3 - 34 KV oil circuit breakers. Dismantled 6 MVA 69/23 KV portion of the substation. Removed 50 MVA transformer.

Extensions to Main Substations (cont'd)

Harmattan - 256S	Installed 23 KV oil circuit breaker.
Holden - 53S	Installed 10 MVA 23.9 KV voltage regulator. Removed 18.75 MVA 138/69 KV transformer.
North Calder - 37S	Installed 300 MVA 240/138 KV transformer and 2 - 138 KV oil circuit breakers.
Rangeland - 995S	Installed 3 MVA transformer.
Wainwright - 51S	Installed 10 MVA 69/23.9 KV transformer, 2 - 69 KV and 3 - 34 KV oil circuit breakers. Removed 6 MVA 69/23 KV transformer and 2 - 15 KV 600 A oil circuit breakers.
Bellevue - 34S	Removed 18.75 MVA 138/69 KV transformer for use at Redwater. Also removed 138 KV oil circuit breaker.
Dow Chemical - 831 S	Dismantled 6 MVA 69/13.8 KV substation.
Niton - 228 S	Removed 3 MVA 69/2.4 KV transformer.

(4) Services

New Communities

The Waiparous, Skeleton Lake and Wandering River subdivisions were provided with service during 1968.

Street Lights

During 1968, Calgary Power Ltd. added approximately 1,387 Mercury Vapor street lights to its system. Included in this figure is the replacement of some 535 Radial Wave units of the incandescent type.

Oilfields

Additional oilfield service load of 7,754 HP was connected to the system during the year. This included oilwell pumps, gas well pumps, gathering systems, water pump and injection systems and other miscellaneous services. Due to the unitization and termination of other oilfield services, 4,524 HP was disconnected, thus the net increase was only 3,230 HP.

The most active areas this year were the Provost, Jenner and Pembina fields. There are now a total of approximately 83,000 HP oilfield services in Calgary Power's service area, an increase of 700 HP over 1967.

Industrial and Power Services

Large, new and expanded industrial installations added some 40,000 KW of potential load to the system in 1968. New pipeline pumping service amounted to 500 HP of connected load.

CANADIAN UTILITIES, LIMITED

(1) Plant Capacity

During 1968 the following changes were made to the company's generating facilities:

Plant Name and Location	Capacity Removed 1968	Capacity Added 1968	Year End 1968 Capacity
Vermilion	1 - 30,000 KW		9,000 KW
Rainbow Lake		1 - 30,000 KW	30,000 KW
Fort McMurray	1 - 350 KW	1 - 2,500 KW	
	1 - 225 KW	1 - 650 KW	
	1 - 150 KW	1 - 500 KW	7,550 KW
Fort Chipewyan	1 - 300 KW	1 - 350 KW	
	1 - 75 KW		650 KW
Grande Prairie	1 - 2,500 KW		
	1 - 800 KW		
	1 - 600 KW		
Grande Prairie Microwave Sites	1 - 20 KW		60 KW

In addition to the above capacity changes, the company purchased from Calgary Power Ltd. the generating facilities installed at the McIntyre-Porcupine coal mine site at Grande Cache. The installation included 1 - 650 KW unit, and 2 - 75 KW units, totalling 800 KW.

At the company's Battle River plant site near Forestburg, construction of the 150 MW installation is proceeding with commissioning scheduled for the fall of 1969. The building's exterior was completed early in 1968, while boilers and turbo-generator block were completed late in 1968. Installation of the turbo-generator has already begun and should reach completion in mid 1969.

(2) Transmission Lines

Canadian Utilities, Ltd. built the following transmission lines during 1968:

Battle River Plant to Nevis	240 KV	41 Miles
Mitsue to Calgary Power tie at Barrhead	240 KV	62 "
Delburne to Nevis	144 KV	12 "
Valleyview to Sturgeon	144 KV	12 "
Youngstown to Oyen	72 KV	35 "
Nevis sub to Nevis Town	72 KV	6½ "
Provost Oilfield extension	25 KV	15 "
Mobil Gas Plant Loop, Three Hills	25 KV	8 "
Hudson's Bay Oil & Gas, Fox Creek	25 KV	5 "
Hanna Town Loop	25 KV	4 "

(3) Substations

Six new substations were added to the company's system during 1968. One, near Hanna, replaced an existing substation and resulted in no change in capacity. Three other new substations, a 1500 KVA installation for the Peace River Oil Pipeline near Valleyview, a 3000 KVA installation at Oyen and a 6000 KVA installation at Rowley are all being operated at 72/25 KV. At Nevis, a new 33,333/KVA substation is being operated at 144/72/25 KV and at the company's Rainbow plant an 1800 KVA installation is being operated at 14.4/144 KVA.

Existing substation capacities were increased by 4500 KVA at Fox Creek, 8,667 KVA at Sarah Lake and 3,000 KVA at Grand Centre, while capacity at the Kinuso substation decreased by 3,000 KVA, all operating at 72/25 KV. An additional 50,000 KVA of capacity was added at the Mitsue substation, operating at 144/72 KV.

NORTHLAND UTILITIES LTD.

(1) Plant Capacity

During 1968, more of Northland's system was tied into the integrated system, resulting in the shutdown of previously isolated plants located at High Level, Rainbow Lake, and Assumption with a total capacity of 2725 KW. Other changes made to the company's generating capacity were as follows:

Plant Name & Location	Capacity Removed 1968	Capacity Added 1968	Year End - 1968 Capacity
Jasper Diesel		1 - 500 KW	3825 KW
Wabasca	1 - 100 KW	1 - 300 KW	650 KW
Zama Lake		2 - 600 KW 1 - 500 KW 2 - 75 KW	1850 KW

(2) Transmission Lines

Northland Utilities Ltd. completed the following transmission lines during 1968.

Hotchkiss to Cadotte River	144 KV	49 miles
Hotchkiss to Keg River	144 KV	42 "
Keg River to Rainbow Lake	144 KV	89 "
Grimshaw to Nampa	144 KV	29 "
Rainbow Lake to Assumption	25 KV	13 "
Zama Lake Oilfield Extensions	25 KV	80 "

(3) Substations

During 1968 Northland Utilities constructed four new substations. Two of these, each consisting of 7500 KVA, are located at Hotchkiss and Keg River and are operating at 144/25 KV. Another 7500 KVA installation on the Cadotte River is operating at 144/4.16 KV, and a 33,333 KVA substation, located in West Peace River, is operating at 144/72/25 KV.

There were no major changes in capacities of existing substations.

CITY OF EDMONTON

During 1968, construction advanced well on the City of Edmonton's new Clover Bar generating station in which it is planned to install a first unit of 159 M.W. capability during 1970.

FORECAST TO 1973

Table 21 shows the growth which we believe will take place in the electrical load of the province from now until 1973. It shows the actual capability in M.W. of the power plants as at December 31, 1968, the peak load that occurred and the minimum capability required. In a large power system it is always necessary to have reserve capacity in case one or more units fail. Current practice on this continent is to maintain a reserve of whatever is the greater of: (1) 12% of the estimated peak load, or (2) the largest unit.

On the basis, we have shown a column which we have called Minimum Capability Required. Since in 1968, for instance, the largest unit in the province was rated at 285 M.W., the minimum capability required had to be so large that if this unit went out of service we would still have a capability equal to or greater than 1,457 M.W., which of course was the estimated peak load. As will be seen from the table, we had a capability of 1,892 so that if the 285 M.W. machine had failed, we would still have had 1,607 M.W. of capability to carry a peak load of 1,457 M.W.

Table 21 indicates that by the end of 1973 our power plant capability will increase from 1,892 M.W. as at the end of 1968 to 2,866 M.W.--five years later. All but 100 M.W. of this increased capability will be thermal.

Making a detailed forecast for the further five years to 1978 is a little venturesome, but by the end of that year, as we see it at the moment, we will have a power plant capability of about 4,500 M.W. This increased capability will most likely be obtained by adding the

TABLE NO. 21

FORECAST OF NET GENERATING CAPABILITY IN M.W. WITHIN THE INTERCONNECTED SYSTEM

	Net Capability added during Year	Net Capability at End of Year	Estimated Peak Load	Minimum Capability Required *
Capability as at December 31, 1968	-	1,892	1,457	1,742
Capability to be added 1969				
Canadian Utilities - Battle River	150			
Total, December 31, 1969	150	2,042	1,600	1,885
Capability to be added 1970				
City of Edmonton	159			
Total, December 31, 1970	159	2,201	1,760	2,045
Capability to be added 1971				
Calgary Power - Sundance	286			
Canadian Utilities - Rainbow	20			
Total, December 31, 1971	306	2,507	1,930	2,215
Capability to be added 1972				
Canadian Utilities - McIntyre	100			
Calgary Power - Bighorn	100			
Total, December 31, 1972	200	2,707	2,100	2,385
Capability to be added 1973				
City of Edmonton	159			
Total, December 31, 1973	159	2,866	2,310	2,600

* Estimated Peak Load plus the greater of 12% or the largest unit.

equivalent of at least three more 300 M.W. thermal units and will involve starting on another large strip mine and possibly a second. We would expect our power generating capability in 1978 to be two and one-half times of what it is now.

FARM ELECTRIFICATION

Even though the network of farm electrification lines extends into the most remote bays of the farming areas, nevertheless, during 1968, 1,440 new R.E.A. members were added to the system, so that now there are 63,357 R.E.A. farms with service available on them.

It should be noted that the format of Tables 19 and 22 has been changed. Table 19 now provides information on both R.E.A. and non-R.E.A. farms, while Table 22 is confined to R.E.A. farms. In previous years, this table reported the total number of R.E.A. and non-R.E.A. farms which had been actually constructed to that date. The present Table 22 provides more data on R.E.A. farms and finally shows the number of R.E.A. farm services using power at the end of the year.

Over the years, 63,731 R.E.A. farm services have been built, but some of them have been dismantled and some are disconnected, so that while 63,357 have power available only 58,012 were being billed at the end of 1968. In addition to these R.E.A. farms, of course, the power corporations serve 5,223 farms in experimental areas or otherwise, and this brings the total number of farms with power in use to 63,235.

According to the 1966 Census, Albertans operated 69,411 farms but only lived on 61,997 of them. Since that year, the number of farms on which someone lives has continued to decrease and we estimate that now there are about 61,000 in that category.

There is a discrepancy between the 61,000 farms on which someone lives and the 63,235 farm services which are energized. Any comparison between these figures is complicated by a number of factors: the number of farms from which the farmer has moved off but left the service there;

TABLE NO. 22

FARM ELECTRIFICATION AS AT DECEMBER 31, 1968 (R.E.A.'s ONLY)

	Farm Services Constructed	Services Salvaged Or Transferred to Other Uses	Services With Power Available	Services Disconnected	Farm Services With Power In Use
SOUTHERN AREA					
Calgary Power Ltd.	43,655	285	43,370	3,321	40,049
Canadian Utilities Ltd.	13,237	63	13,174	1,225	11,949
Livingstone R.E.A. and Lundbreck Co-op	148	4	144	4	140
Southern Area Sub-total	57,040	352	56,688	4,550	52,138
PEACE RIVER AREA					
Canadian Utilities Ltd.	3,357	13	3,344	371	2,973
Northland Utilities Ltd.	3,334	9	3,325	424	2,901
Peace River Area Sub-total	6,691	22	6,669	795	5,874
Total R.E.A. Farm Services	63,731	374	63,357	5,345	58,012

the varying definitions of a farm, including Indian homes on reserves, and the movement of city people to small acreages in the country which, because they have a horse or two or some chickens, the R.E.A.'s consider as farms.

The Dominion Bureau of Statistics classifies farms on the basis of income. Farms with receipts of $2,500 or more a year are classified as commercial farms, while small scale, part-time, and residential farms receiving less than $2,500 from the sale of agricultural products are considered non-commercial operations.

Changes in farm numbers, based on economic classification, as described above, are shown in the following table:

	1961	1966	% of Change
Commercial Farms	45,203	48,971	+ 8.3
Other Farms	28,009	20,440	- 27.0
All Farms	73,212	69,411	- 5.2

The decrease in farm numbers between 1961 and 1966 was less in the south than in other parts of the province. The reason for this situation is that the consolidation of farms to form economic units was begun in that area approximately 50 years ago. The number of small farms is decreasing all the time.

A reduction in the number of small farms, accompanied by an increase in commercial farms, is most pronounced in the central and northern regions of Alberta. A 21 per cent increase in the number of commercial farms in the Peace River area is just about equalled by the 18.5 per cent decrease in small farms.

The trend towards the development of commercial farms, which has been accompanied by a decrease in non-commercial farms in the last five years, can be expected to continue. The period of adjustment will take a longer time in areas such as the grey-wooded soil zone, including the Peace River area, where homesteading is still being practised.

In any event, the saturation of farm electrification is well over 95 per cent in all but Census Divisions 12 and 15 where it is over 90 per cent.

The increase in the number of Indian homes or farms on reserves being served by power lines is encouraging. Although the census only shows some 600 Indian farms, over 2,400 Indian homes now have central station service and, as might be expected, the bulk of these are south of the Athabasca river. About 500 Indian homes in some reserves are served as customers of the power company while 1,971 of them are served as R.E.A. customers mainly in the following reserves:-

Alexander
Beaver Lake
Big Horn
Blood
Blackfoot
Eden Valley
Enoch
Ermineskin
Louis Bull
Montana
Morley
Peigan
O'Chiese
Samson
Sunchild
White Whale
Le Goff
Puskiakiwenen

Power lines are within easy reach of most of the northern reserves but so far little advantage has been taken of this fact. Power service is also available on the Paddle Prairie, Heart River, Elizabeth and Kikino Metis colonies and is within three miles of the East Prairie River colony, but so far very few of the residents are using power.

As will be seen from Table 19, while there are 63,235 farms actually using power, the farm electrification lines also serve 11,284 non-farm customers. Of these, 9,803 are served off R.E.A.-owned lines, while the remaining 1,481 obtain their service from company-owned farm lines. The total number of rural customers associated with these farm electrification lines is therefore 74,519.

As at the end of December, 1968, there were 47,755 miles of farm line of which 44,705 were owned by the R.E.A.'s. During the year 497 miles of all categories of farm lines were constructed.

Financing

At the end of December there were a total of 385 active Rural Electrification Associations. These Associations have borrowed under the Guarantee Act, the Revolving Fund Act and the Long Term Financing Act, and the total of all of these borrowings for new construction has been approximately $55,352,000. At December 31, 1968, about $38,865,000 of this had been paid back. The investment in R.E.A. and other rural lines in the province is slightly over $63,000,000.

Up to the end of 1968, the Power Commission had given approval to 5,990 applications for loans under Part I of the Revolving Fund Act or under the Long Term Financing Act. While all of this money had not been borrowed by the end of December, the approvals covered 46,021 farms at an estimated cost of $54,842,300.

During 1968, the Power Commission gave approval to applications for loans under Part I of the Revolving Fund Act or under the Long Term Financing Act for an amount of $1,845,050 to give service to 1,251 farms. Of this amount, $1,771,533 was approved where no Part II loan was necessary. Of these 1,251 farms, 42 of them were in areas that needed assistance of

Part II loans which totalled $73,516. The framework of lines in these new Part II areas will make it possible for additional farmers to connect to them whenever they are ready.

Since its inception, approvals of loans under Part II legislation have totalled $2,215,797. As at December 31, 1968, $280,280 of this remains outstanding, including $73,516 loaned during 1968. Out of a total of 368 Part II loans which have been issued to date, 272 have been repaid in full and a great many more are nearly paid off.

Operating Conditions in R.E.A.'s

Even though the construction phase of farm electrification is practically finished, well over 1,000 farms continue to be hooked up each year. It is still necessary, therefore, for the power companies to maintain farm construction crews but the nature of their work is changing. As well as doing the tasks necessary to operate the farmers' lines and to perform maintenance on them, the crews are now faced with the work involved in moving lines for road widening, providing increased clearance over graded-up roads and revamping some portions of the R.E.A.'s systems to gear them up to carrying the increasingly large loads being placed on them. The emphasis of farm electrification has changed from being mainly construction to the more or less regular business of operating and revamping R.E.A. systems--some of which are now twenty years old.

The experience we are having with these systems parallels that of the other lines which the power companies have been operating for several decades. Unfortunately, as in all other construction the cost of building lines keeps going up. The cost of material and labour keeps increasing but these

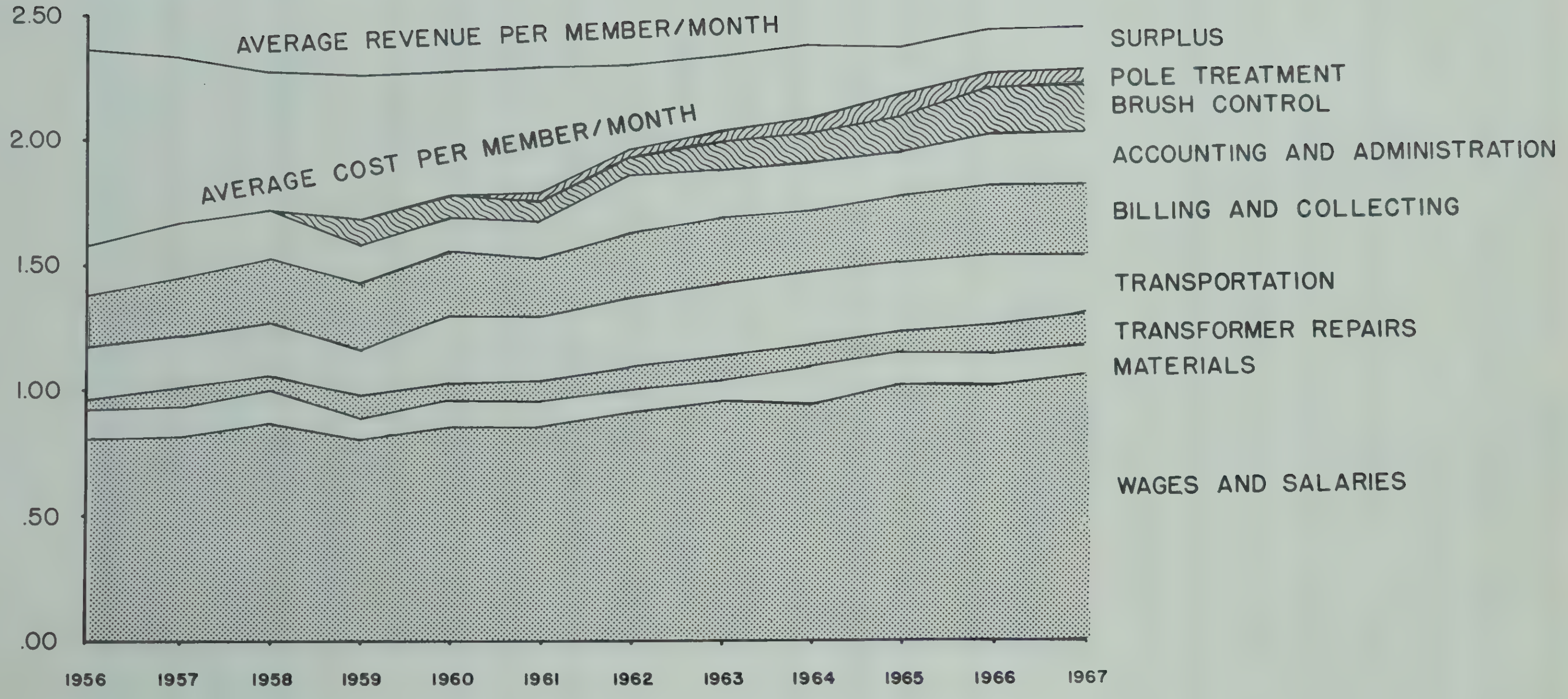


CHART NO. 3 - OPERATING REVENUE AND COMPONENTS OF COST OF OPERATION FOR THE YEARS FROM 1956 - 1967.

increases are not so serious as that occasioned by having to move crews around to hook up one or two farmers in each R.E.A. The time and cost incurred by this moving around doing a small job here and another there runs up the cost of separate extensions far beyond what it was a few years ago when many farmers were being hooked up as a group in each R.E.A. The power companies have adjusted their crews and the scheduling of these jobs so that as far as possible a farmer requesting service does not have to wait too long, although, unfortunately in spite of this, some problems still arise.

As usual, the Commission has checked the statements which the companies have rendered to R.E.A.'s, showing the costs of building their lines. In addition to this, some field checks have been made on various farm areas. With very minor exceptions, these costs have always been found to be correct.

In all of the years to date, the actual operating costs have been less than the monthly charge made to the farmer in his power bill, so that at the end of each year the companies have been able to make a refund to the Deposit Reserves of the Associations. Unfortunately, the utmost efficiency in operating these lines is not enough to keep pace with the inflationary rise in material and labour costs. Moreover, as the lines get older, considerable maintenance is becoming necessary and this adds to operating expenses. Increases in cost and inflation are gradually narrowing the spread between the actual costs and the nominal operating surplus. The following table shows the operating surplus back to 1959.

Excess Operating Refund per Member Month

Year	Farm Electric Services Ltd.	Canadian Utilities Ltd.	Northland Utilities Ltd.
1959	.53	.81	.02
1960	.51	.55	.02
1961	.45	.69	.13
1962	.24	.63	.29
1963	.20	.54	.50
1964	.18	.61	.66
1965	.15	.27	.43
1966	.02	.58	.33
1967	.04	.51	.27

Chart No. 3 shows revenue and the components of cost of operation for the years 1956-68, while the chart on this page shows a comparison of the cost of operation index with the weekly wages and salaries index from the beginning of R.E.A. operations in 1949 to the end of 1967. The wages and salaries index uses a basis of 1949 equals 100 and is compiled from figures published by the Dominion Bureau of Statistics. For comparison purposes, we have worked out the cost of operations index on the same basis, using 1949 equals 100.

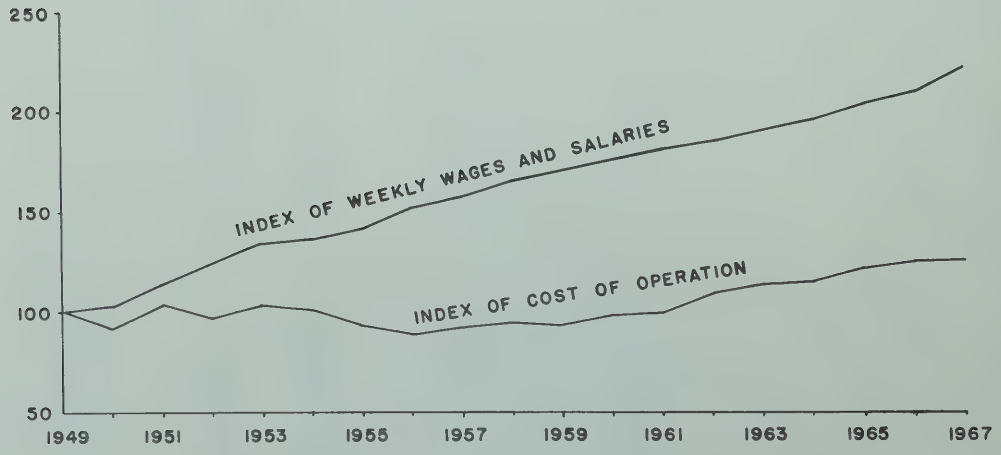


CHART NO. 4 - COMPARISON OF INDEX OF COST OF OPERATION WITH INDEX OF WEEKLY WAGES AND SALARIES.

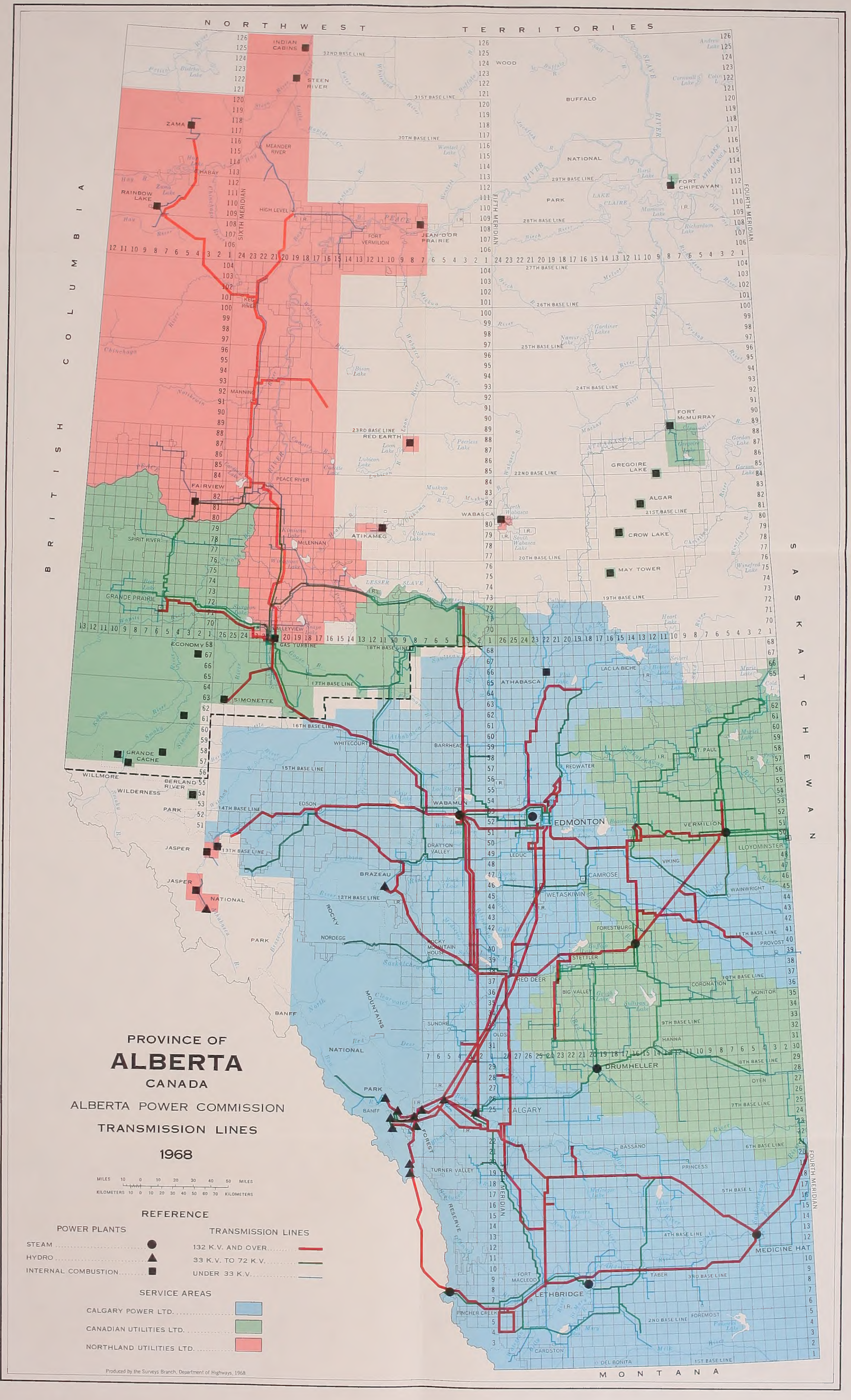
Figures used in Charts 3 and 4 on the preceding pages are averages and therefore vary slightly from the figures of either company. While, due to yearly variations, figures for specific components of costs for any given year should be treated with caution, there are a number of interesting general conclusions which appear to be warranted:

1. Revenue per member month appears to be rising very slightly coincident with the installation of larger farm transformers. Added transformer capacity charges, of course, go to increase the R.E.A.s' deposit reserves which have to provide the cost of upgrading the R.E.A.s' lines.
2. The total cost of operation shows a slow but steady rise. This is due primarily to inflation and partly to added items of expense such as brushing and testing and treating poles which are due to the aging of the system.
3. While in the main the increase in operating cost over this period has been due to the rise in wages and salaries, it has increased at a lesser rate than these items even in spite of the additions of these new types of expenses. This indicates increased efficiency due to the servicing of additional customers and various other economies affected. Most of the other items of expense have remained almost unchanged.

The Power Commission has endeavoured to study all phases of farm electrification. The operation of farm lines presents many intricate problems that change as the years go by. In its engineering and accounting aspects, farm electrification is highly technical and the individual R.E.A. does not have the time nor the opportunity to investigate these matters. The Commission feels that one of its main responsibilities is to see that consideration is given to every factor that could possibly reduce the cost of electricity to the farmers, and to improve the efficiency of service.

During 1968, the average use on Alberta farms was 7,343 K.W.H. This is more than double the power used per farm ten years ago. While farm consumption has doubled during the past decade, the K.W.H. generated per capita during the same period has increased more rapidly.

During the past year, the Power Commission has been deeply involved in studies in connection with the Mead Report, with particular reference to Deposit Reserve aspects. Various suggestions have been advanced which, if adopted, would make considerable change in the method of billing and collecting reserves, but these have not been finalized.



PROVINCE OF
ALBERTA
CANADA

ALBERTA POWER COMMISSION
TRANSMISSION LINES
1968

MILES 10 0 10 20 30 40 50 MILES
KILOMETERS 10 0 10 20 30 40 50 60 70 KILOMETERS

REFERENCE

POWER PLANTS
- STEAM ●
- HYDRO ▲
- INTERNAL COMBUSTION ■

TRANSMISSION LINES
- 132 K.V. AND OVER
- 33 K.V. TO 72 K.V.
- UNDER 33 K.V.

SERVICE AREAS
- CALGARY POWER LTD. 🟦
- CANADIAN UTILITIES LTD. 🟩
- NORTHLAND UTILITIES LTD. 🟥

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